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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/811,564	03/29/2004	Nicholas P. Clague	0013.0043	1381
63970 7590 02/20/2008 MH2 TECHNOLOGY LAW GROUP (Cust. No. w/NewMarket) 1951 KIDWELL DRIVE SUITE 550 TYSONS CORNER, VA 22182			EXAMINER NGUYEN, TU MINH	
			ART UNIT 3748	PAPER NUMBER
			MAIL DATE 02/20/2008	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

Application No.

10/811,564

Applicant(s)

CLAGUE ET AL.

Examiner

Tu M. Nguyen

Art Unit

3748

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 08 November 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-14 and 16-23 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-14 and 16-23 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_.

### DETAILED ACTION

1. An Applicant's Amendment filed on November 8, 2007 has been entered. Claims 1, 2, and 19 have been amended; and claims 21-23 have been added. Overall, claims 1-14 and 16-23 are pending in this application.

#### *Claim Rejections - 35 USC § 103*

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office Action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. **Claims 1-6, 8-14, and 16-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Guinther et al. (U.S. Patent 6,821,932) in view of Mizuno et al. (U.S. Patent 6,684,627).**

Re claims 1, 8, and 19, Guinther et al. disclose a fuel composition for four-stroke engines and a method for controlling the deleterious effect and for improving the durability of an exhaust emissions after-treatment and control devices of at least one metal contaminant and compounds thereof in an exhaust stream from the combustion of a combustible fuel composition in a combustion system or chamber of said four-stroke engine, the method comprising the steps of:

(a) intaking said fuel composition into a combustion system or chamber of a four-stroke engine, wherein the fuel composition comprises:

- i) combustible hydrocarbonaceous liquid fuel (lines 19-20 of column 6),
- ii) lubricant comprising an oil of lubricating viscosity (lines 14-15 of column 6),
- iii) an organosulfur compound comprising an alkaline earth metal-containing compound (calcium) (line 18 of column 6), and
- iv) a molybdenum source (lines 21-22 of column 6);

(b) combusting in the combustion system or chamber the hydrocarbonaceous fuel to produce combustion products comprising at least one material (organosulfur) selected from the group consisting of alkaline earth metal and compounds thereof (see lines 57-67 of column 7 and lines 33-38 of column 8);

(c) contacting the molybdenum with at least one of the alkaline earth metal, and compounds thereof, in the combustion products (see lines 45-47 of column 8), and

(d) flowing the combustion products over at least one of a catalyst (lines 45-47 of column 6), a sensor, and an on-board diagnostic device, or a combination of these;

wherein the molybdenum interacts with at least one of the alkaline earth metal or compounds thereof effective to increase detergency, as compared to conducting the same method without including the molybdenum source in the fuel composition, and without blocking at least one of the catalyst, sensor, and on-board diagnostic device (see lines 44-54 of column 6).

Guinther et al., however, fail to disclose that the fuel composition is used for a two-stroke engine; and that calcium is a detergent that reacts with at least one of sulfur and phosphorus during a combustion of the fuel composition in an internal combustion engine to form complex

compounds in solid form so that poisoning of catalyst by gaseous form of sulfur and phosphorus compounds is prevented.

Guinther et al. disclose the claimed invention except for applying the invention to two-stroke engine. It would have been obvious to one having ordinary skill in the art at the time the invention was made to apply the fuel composition of Guinther et al. to a two-stroke type engine, since the recitation of such amounts to an intended use statement. Note that both "two-stroke engine" and "four-stroke engine" generate exhaust gases containing harmful emissions of HC, NO<sub>x</sub>, soot, CO, etc, that require purification before the gases can be released to the atmosphere; and the mere selection of the fuel composition of Guinther et al. for use in a two-stroke engine would be well within the level of ordinary skill in the art.

As shown in Figure 1, Mizuno discloses an exhaust purification system for an internal combustion, comprising a NO<sub>x</sub> trap (39) adapted to adsorb NO<sub>x</sub> emissions in an exhaust gas stream. As indicated in the Abstract and on lines 18-26 of column 12, Mizuno et al. teach that it is conventional in the art to add a solidifier or a detergent in the form of a calcium compound into an engine fuel so that the calcium compound readily reacts with at least one of sulfur and phosphorus during a combustion of the engine fuel to form complex compounds in solid form so that poisoning of catalyst by gaseous form of sulfur and phosphorus compounds is prevented (also see lines 24-37 of column 9). Hence, based on the teaching by Mizuno et al., it would have been obvious to one having ordinary skill in the art at the time of the invention was made, to have realized that the calcium compound in the fuel composition of Guinther et al. is indeed a detergent that readily reacts with at least one of sulfur and phosphorus during a combustion of the fuel composition to form complex compounds in solid form.

Re claims 9 and 20, in the modified method of Guinther et al., the fuel composition is a composition as disclosed, wherein the detergent comprises a detergent selected from the group consisting of neutral calcium sulphonate detergents and neutral calcium phenate detergents, or combinations and mixtures thereof.

Re claims 2, 3, and 10, in the fuel composition and the modified method of Guinther et al., the detergent comprises a detergent selected from the group consisting of neutral calcium sulphonate detergents and neutral calcium phenate detergents, or combinations and mixtures thereof.

Re claim 4, in the fuel composition of Guinther et al., the molybdenum source is selected from the group consisting of molybdenum trioxide, molybdenum sulfonates, molybdenum phenates, molybdenum salicylates, molybdenum carboxylates, mono-nuclear and di-nuclear and tri-nuclear molybdenum dithiocarbamates, neutral and overbased molybdenum salicylates, overbased molybdenum phenates, overbased molybdenum sulfonates, ammonium molybdate, sodium molybdate and potassium molybdate, and molybdenum halides, compounds derived from molybdenum reacted with amines and alcohols, and combinations and mixtures thereof.

Re claim 5, in the fuel composition of Guinther et al., the molybdenum source comprises an organomolybdenum complex prepared by reacting fatty oil, diethanolamine, and a molybdenum source.

Re claim 6, in the fuel composition of Guinther et al., the liquid fuel is a diesel fuel.

Re claim 11, in the modified method of Guinther et al., the alkaline earth metal (calcium) and compounds thereof in the combustion products originate from the detergent contained in the fuel composition (see line 18 of column 6).

Re claims 12-13, in the modified method of Guinther et al., the combustion system further comprises flowing the combustion products through an after-treatment system (lines 44-51 of column 6), wherein the after-treatment system is selected from the group consisting of a catalyzed diesel particulate filter and a continuously regenerating technology diesel particulate filter.

Re claim 14, Guinther et al. further disclose an apparatus for performing the modified method of controlling the deleterious effect and for improving the durability of an exhaust emissions after-treatment and control device, the apparatus comprising:

- (a) a two-stroke engine including a combustion chamber adapted to combust a fuel composition;
- (b) a means (fuel injector) to introduce the fuel composition into the combustion chamber;
- (c) means (compression stroke) to initiate combustion of the fuel composition in the combustion chamber;
- (d) a means (exhaust pipe) to convey combustion products from the combustion chamber;
- (e) means (an after treatment system (lines 44-51 of column 6)) to reduce the amount of at least one pollutant from the combustion product; and
- (f) a storage means (fuel tank) containing a fuel composition as claimed above.

Re claim 16, in the apparatus of Guinther et al., the means (e) comprises an after treatment system selected from the group consisting of a diesel oxidation catalyst, a catalyzed diesel particulate matter filter, and a continuously regenerating technology diesel particulate filter (lines 44-51 of column 6).

Re claim 17, in the apparatus of Guinther et al., the apparatus is selected from the group consisting of a motorcycle, a moped, a snow mobile, an all terrain vehicle, tractor, mining equipment, construction equipment, a marine outboard motor, a lawn mower, a chain saw, a pump, an electrical generator, a garden tiller, a landscaping hedge trimmer, and a back pack blower.

Re claim 18, in the apparatus of Guinther et al., the apparatus is selected from the group consisting of a gasoline engine and a diesel engine.

Re claims 21-23, in the fuel composition and modified method of Guinther et al., the detergent is an alkaline earth metal-containing compound (calcium). Guinther et al., however, fail to disclose that the compound comprises a charged polar group having a moiety chosen from aliphatic, cycloaliphatic and alkylaromatic chains.

Since calcium has been recognized as an organic compound having an open-chain structure, that is readily reacted with other compounds such as sulfur or phosphorus, it is obvious to one with ordinary skill in the art that calcium in Guinther et al. is a compound comprising a charged polar group having a moiety chosen from aliphatic chains.

**4. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Guinther et al. in view of Mizuno et al. as applied to claim 1 above, and further in view of legal precedent.**

The fuel composition of Guinther et al. discloses the invention as cited above, however, fails to disclose that the composition comprises about 95 to about 99 wt. % combustible hydrocarbonaceous liquid fuel, about 1 to about 5 wt. % lubricant comprising an oil of



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lubricating viscosity, about 0.001 to about 0.05 wt. % alkaline earth metal-containing compound, and about 1 ppm to about 10 ppm Mo from the molybdenum source.

Guinther et al. disclose the claimed invention except for specifying optimum ranges of a composition of their diesel fuel. It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide specific optimum ranges of a composition of the diesel fuel, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art.

*In re Aller*, 105 USPQ 233.

### ***Response to Arguments***

5. Applicant's arguments with respect to the references applied in the previous Office Action have been fully considered but they are not persuasive.

In response to applicant's argument that since Mizuno teaches or suggests calcium as a "solidifier", Mizuno fails to teach or suggest calcium as a "detergent" (page 9 of the Applicant's Amendment), the examiner respectfully disagrees.

The term "detergent" is defined in a dictionary as "a cleaning agent or an oil-soluble substance that holds insoluble foreign matter in suspension and is used in lubricating oils and dry-cleaning solvents". Since Mizuno teaches that calcium is a cleaning agent or an oil-soluble substance (soluble in diesel fuel) that holds insoluble foreign matter (SO<sub>x</sub> in exhaust gas) in suspension, it is at least obvious to one with ordinary skill in the art that Mizuno teaches or suggests calcium as a "detergent".

***Conclusion***

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

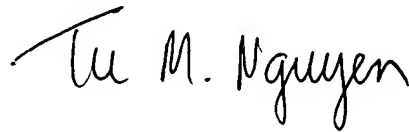
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

***Communication***

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Tu Nguyen whose telephone number is (571) 272-4862.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Thomas E. Denion, can be reached on (571) 272-4859. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink that reads "Tu M. Nguyen". The signature is written in a cursive style with a large, sweeping initial "T".

TMN

Tu M. Nguyen

February 15, 2008

Primary Examiner

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